

THAT WHICH IS CLAIMED IS:

1. An *in ovo* injection apparatus, comprising:
an egg carrier that holds a plurality of eggs
and provides external access to the eggs;
a plurality of injection devices positioned
5 above the carrier, wherein each injection device is
configured to contact a respective egg in the carrier and
deliver a predetermined dosage of a treatment substance
into the egg and/or remove material from the egg; and
an egg support assembly positioned beneath the
10 carrier that is configured to support each egg in the
carrier during contact therewith by a respective
injection device.

2. The apparatus of Claim 1, wherein the egg
15 support assembly comprises:
a frame movable between an operative position
and a retracted position;
a plate attached to the frame and comprising an
array of openings formed therein; and
20 a plurality of pedestals, each pedestal
removably secured within a respective one of the
openings, wherein each pedestal comprises a free end
portion configured to engage an egg within the carrier
when the frame is in the operative position.

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3. The apparatus of Claim 2, wherein the egg
support assembly is operatively associated with the
plurality of injection devices such that each pedestal
moves upwardly through a respective opening in the
30 carrier to support an egg as a respective injection
device makes contact with the egg.

4. The apparatus of Claim 1, wherein the egg

support assembly is configured to lift each egg from the carrier during contact with each egg by a respective injection device.

5 5. The apparatus of Claim 2, wherein a height of the free end portion of each pedestal relative to the plate is adjustable.

10 6. The apparatus of Claim 5, wherein a height of the free end portion of each pedestal relative to the plate is adjustable via one or more shims disposed between the free end portion and the plate.

15 7. The apparatus of Claim 2, wherein each pedestal includes a proximal end opposite from the free end, and wherein an O-ring is secured to the proximal end that provides a snug, friction fit when the proximal end is disposed within a respective one of the plate openings.

20 8. The apparatus of Claim 2, wherein each pedestal free end has a concave configuration.

25 9. The apparatus of Claim 8, wherein each pedestal free end comprises a wall that is inclined relative to a centerline of the pedestal that is between about twenty five degrees and about fifty five degrees (25°-55°).

30 10. The apparatus of Claim 2, wherein the support assembly frame is movable via actuators selected from the group consisting of pneumatic actuators, hydraulic actuators, electronic actuators, and electromagnetic actuators.

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11. An *in ovo* injection apparatus, comprising:
an egg carrier that holds a plurality of eggs
and provides external access to the eggs;
a plurality of injection devices positioned
5 above the carrier, wherein each injection device is
configured to contact a respective egg in the carrier and
deliver a predetermined dosage of a treatment substance
into the egg and/or remove material from the egg; and
an egg support assembly positioned beneath the
10 carrier that is configured to support each egg in the
carrier and lift each egg upwardly from the carrier
during contact therewith by a respective injection
device, wherein the egg support assembly comprises:
a frame movable between an operative
15 position and a retracted position;
a plate attached to the frame and
comprising an array of openings formed therein;
and
a plurality of pedestals, each pedestal
20 removably secured within a respective one of
the openings, wherein each pedestal comprises a
free end portion configured to engage an egg
within the carrier when the frame is in the
operative position.

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12. The apparatus of Claim 11, wherein the egg
support assembly is operatively associated with the
plurality of injection devices such that each pedestal
moves upwardly through a respective opening in the
30 carrier to support an egg as a respective injection
device makes contact with the egg.

13. The apparatus of Claim 11, wherein a
height of the free end portion of each pedestal relative
35 to the plate is adjustable.

14. The apparatus of Claim 13, wherein a height of the free end portion of each pedestal relative to the plate is adjustable via one or more shims disposed between the free end portion and the plate.

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15. The apparatus of Claim 11, wherein each pedestal includes a proximal end opposite from the free end, and wherein an O-ring is secured to the proximal end that provides a snug, friction fit when the proximal end is disposed within a respective one of the plate openings.

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16. The apparatus of Claim 11, wherein each pedestal free end has a concave configuration.

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17. The apparatus of Claim 16, wherein each pedestal free end comprises a wall that is inclined relative to a centerline of the pedestal that is between about twenty five degrees and about fifty five degrees (25°-55°).

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18. The apparatus of Claim 11, wherein the support assembly frame is movable via actuators selected from the group consisting of pneumatic actuators, hydraulic actuators, electronic actuators, and electromagnetic actuators.

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19. An *in ovo* injection apparatus, comprising:
an egg carrier that holds a plurality of eggs
and provides external access to the eggs;

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a plurality of injection devices positioned above the carrier, wherein each injection device is configured to contact a respective egg in the carrier and deliver a predetermined dosage of a treatment substance into the egg and/or remove material from the egg; and

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an egg support assembly positioned beneath the

carrier that is configured to support each egg in the carrier during contact therewith by a respective injection device, wherein the egg support assembly comprises:

- 5 a frame movable between an operative position and a retracted position;
 a plate attached to the frame and comprising an array of openings formed therein; and
10 a plurality of pedestals, each pedestal removably secured within a respective one of the openings, wherein each pedestal comprises a concave free end portion configured to engage an egg within the carrier when the frame is in
15 the operative position, and wherein a height of the free end portion of each pedestal relative to the plate is adjustable.

20 20. The apparatus of Claim 19, wherein the egg support assembly is operatively associated with the plurality of injection devices such that each pedestal moves upwardly through a respective opening in the carrier to support an egg as a respective injection device makes contact with the egg.

25 21. The apparatus of Claim 19, wherein the egg support assembly is configured to lift each egg from the carrier during contact with each egg by a respective injection device.

30 22. The apparatus of Claim 19, wherein a height of the free end portion of each pedestal relative to the plate is adjustable via one or more shims disposed between the free end portion and the plate.

35 23. The apparatus of Claim 19, wherein each

pedestal includes a proximal end opposite from the free end, and wherein an O-ring is secured to the proximal end that provides a snug, friction fit when the proximal end is disposed within a respective one of the plate
5 openings.

24. The apparatus of Claim 19, wherein each pedestal free end comprises a wall that is inclined relative to a centerline of the pedestal that is between
10 about twenty five degrees and about fifty five degrees (25°-55°).

25. The apparatus of Claim 19, wherein the support assembly frame is movable via actuators selected
15 from the group consisting of pneumatic actuators, hydraulic actuators, electronic actuators, and electromagnetic actuators.

26. A method of injecting eggs *in ovo*,
20 comprising:
positioning an egg carrier containing a plurality of eggs beneath a plurality of injection devices, wherein each injection device is configured to contact a respective egg in the carrier and deliver a
25 predetermined dosage of a treatment substance into the egg and/or remove material from the egg; and
supporting the plurality of eggs from beneath the egg carrier while simultaneously delivering a predetermined dosage of a treatment substance into each
30 egg and/or removing material from each egg.

27. The method of Claim 26, wherein supporting the plurality of eggs comprises positioning an egg support assembly beneath the egg carrier, wherein the egg
35 support assembly comprises:

a frame movable between an operative position

and a retracted position;

a plate attached to the frame and comprising an array of openings formed therein; and

5 a plurality of pedestals, each pedestal removably secured within a respective one of the openings, wherein each pedestal comprises a free end portion configured to engage an egg within the carrier when the frame is in the operative position.

10 28. The method of Claim 26, wherein supporting the plurality of eggs comprises lifting the eggs upwardly from the egg carrier.

15 29. The method of Claim 26, wherein each pedestal free end has a concave configuration.